

WHAT IS CLAIMED IS:

1. An apparatus for filling at least one cavity in an article with granular or particulate material, said apparatus comprising:

a filling chamber containing the material;

5 a rotating wheel having at least one pocket defined in an outer circumferential surface, said at least one pocket receiving the material in the filling chamber and the outer circumferential surface defining at least part of a side of said filling chamber; and

a conveying device adapted to position at least one article having at least
10 one cavity to be filled with said material underneath said wheel to receive said material from said at least one pocket.

2. The apparatus according to claim 1, further including a stationary drum positioned inside of said rotating wheel and defining a vacuum chamber in communication with said at least one pocket over a predetermined distance of
15 rotation of said rotating wheel.

3. The apparatus according to claim 1, wherein the at least one pocket comprises a plurality of radially inwardly diverging pockets defined in the outer circumferential surface of said rotating wheel, with a radially inner extent of said pockets being defined by a single perforated band or screen positioned against the
20 inner circumferential surface of said wheel.

4. The apparatus according to claim 1, further comprising a chute supplying the material to the filling chamber.

5. The apparatus according to claim 3 wherein said perforated band or screen is clamped against the inner circumferential surface of said wheel by a clamp ring positioned inside the wheel.

5 6. The apparatus according to claim 4, wherein the chute has a length such that the material entering said filling chamber from said chute is traveling at a velocity approximately equal to the velocity of the pockets on the outer circumferential surface of the wheel.

10 7. The apparatus according to claim 6, wherein guide vanes are provided within said filling chamber for directing the material toward said pockets in said wheel.

8. The apparatus according to claim 1, wherein said conveying device includes at least one vacuum chamber for drawing the material into the at least one cavity from the wheel.

15 9. The apparatus according to claim 8, wherein said conveying device includes at least one chamber having relatively higher vacuum and at least one chamber having relatively lower vacuum, with the at least one higher vacuum chamber being positioned underneath a cavity being filled with material from a pocket in said wheel.

20 10. A method of filling a cavity in an article with granular material, said method comprising:
providing a wheel rotatable around a stationary drum defining a vacuum chamber, said wheel having at least one pocket defined in its outer periphery, and at

least a portion of the outer periphery of said wheel defining at least a portion of one side of a filling chamber

rotating said wheel around said stationary drum and creating a vacuum in said vacuum chamber;

5 dropping said material into said filling chamber, and

communicating said vacuum to said at least one pocket over a distance from when said at least one pocket is positioned along said one side of said filling chamber and interrupting said vacuum at a point at which material in said at least one pocket is transferred to a cavity in an article.

10 11. The method according to claim 10, further including:

blowing air through said at least one pocket when said at least one pocket is positioned over a cavity in an article to assist in emptying said pocket into said cavity.

12. An apparatus for filling at least one cavity in an article with granular or particulate material, said apparatus comprising:

15 a filling chamber into which said granular or particulate material is dropped through a top opening;

a stationary vacuum chamber; and

20 a plurality of spaced apart receptacles wherein each of said receptacles is mounted for movement past the stationary vacuum chamber and into alignment with a corresponding cavity in an article, said receptacles being in communication with a vacuum created in said stationary vacuum chamber from a first point at which said granules or particles are introduced into said receptacles from said filling chamber to a second point near where the granules or particles are inserted into the
25 corresponding cavities.

13. The apparatus according to claim 12, wherein said plurality of spaced apart receptacles are formed in the outer periphery of a wheel that rotates around said stationary vacuum chamber.

5 14. The apparatus according to claim 13, wherein a vacuum rail is provided for supporting and moving an article having cavities to be filled with granules or particles underneath said wheel.

10 15. The apparatus according to claim 14, wherein said vacuum rail includes a vacuum that pulls granules or particles from said receptacles into said cavities and cleans away loose granules or particles positioned on said article outside of said cavities.

16. The apparatus according to claim 15, further including a drop chute positioned above said filling chamber and through which granules or particles are dropped to accelerate under the influence of gravity before entering said filling chamber.

15 17. The apparatus according to claim 16, wherein said filling chamber includes a plurality of openings on a side opposite from the side of the filling chamber where granules or particles are introduced into said receptacles.

20 18. The apparatus according to claim 17, wherein an air jet is provided adjacent said stationary vacuum chamber and said second point for blowing said granules or particles into said corresponding cavities.

19. The apparatus according to claim 18, wherein a single perforated band or screen defines the bottoms of a plurality of said spaced apart receptacles.

20. The apparatus according to claim 19, wherein a segmented clamp holds said perforated band or screen against the inner periphery of said wheel.

5 21. A system for filling at least one cavity in an article with granular or particulate material, said system comprising:

at least one insertion station, said insertion station including a filling chamber into which said granular or particulate material is dropped through a top opening;

10 a stationary vacuum chamber; and

a plurality of spaced apart receptacles wherein each of said receptacles is mounted for movement past the stationary vacuum chamber and into alignment with a corresponding cavity in an article, said receptacles being in communication with a vacuum created in said stationary vacuum chamber from a first point at which said granules or particles are introduced into said receptacles from said filling chamber to a second point near where the granules or particles are inserted into the corresponding cavities.

22. The system according to claim 21, wherein two of said insertion stations are provided with a first one of said two insertion stations at least partially filling a cavity in an article with particles, and a second one of said two insertion stations adding more of the particles or a different material to the same or a different cavity in the article.